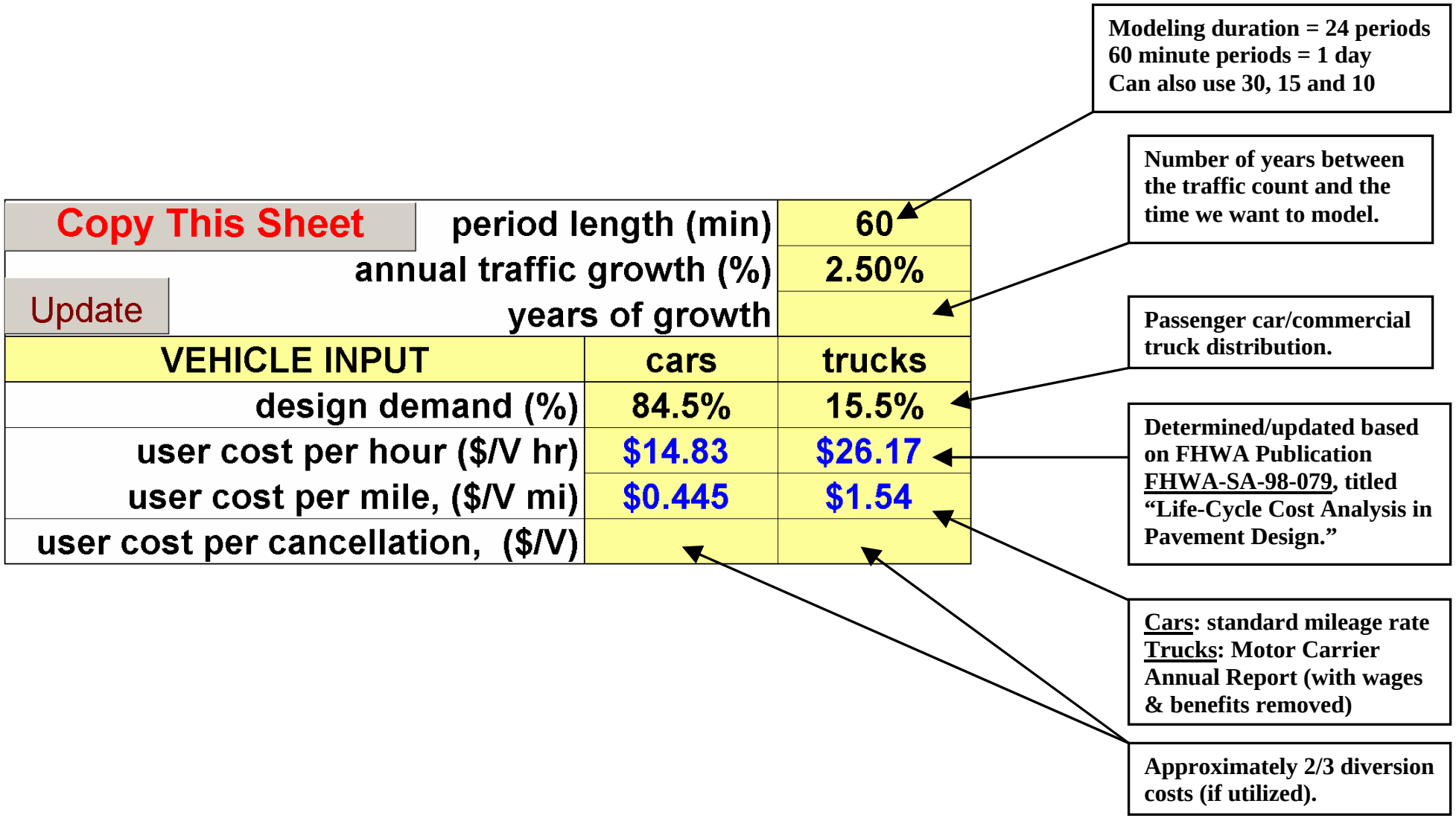
PROJECT INFORMATION			REPORT INFORMATION	
PROJECT TITLE	I-69 From Irish Rd to M-15		REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET
Paste Values	C.S.	25084	DIVISION	C&T
	JOB #	56984	REPORT BY	BK
	START DATE		REPORT DATE	3/11/2005

NOTES: Stage 1: Maintain 1 EB lane and 2 WB lanes
Stage 2: Maintain 2 lanes in each direction

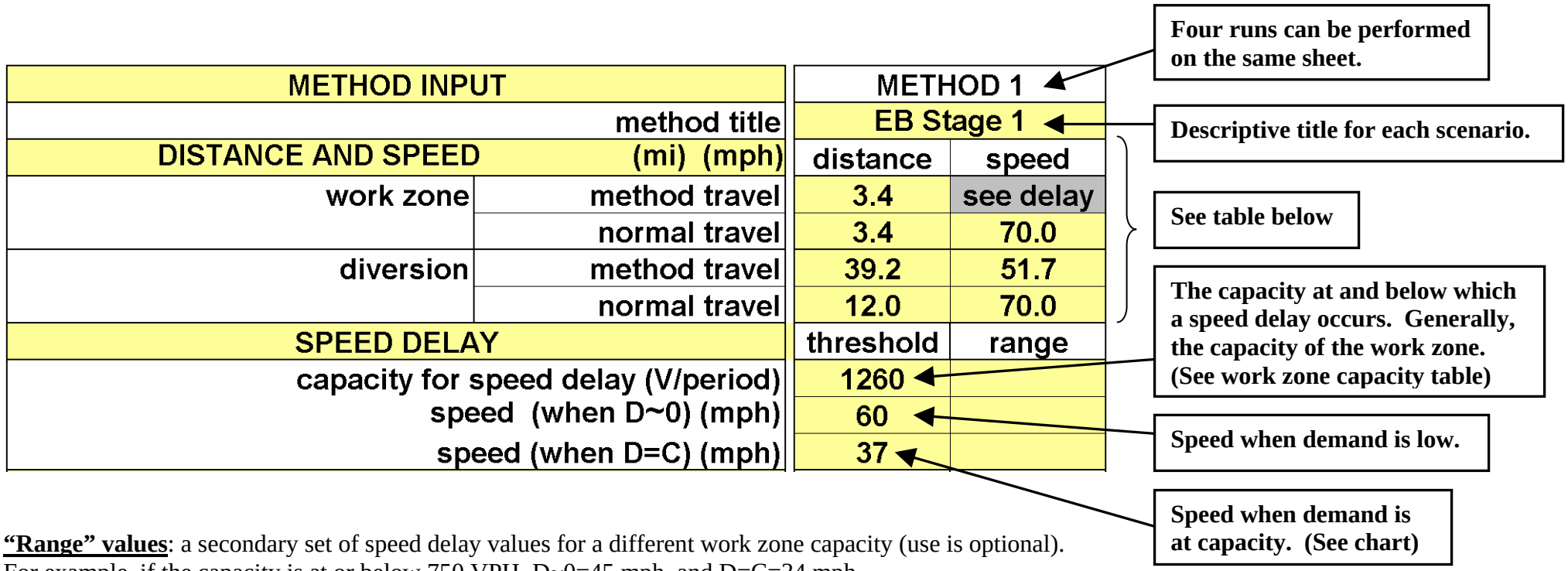
Input general project level information.

Briefly describe the MOT schemes to be modeled.



Copy This Sheet	period length (min)	60
	annual traffic growth (%)	2.50%
Update	years of growth	

VEHICLE INPUT	cars	trucks
design demand (%)	84.5%	15.5%
user cost per hour ($/V hr)	$14.83	$26.17
user cost per mile, ($/V mi)	$0.445	$1.54
user cost per cancellation, ($/V)		

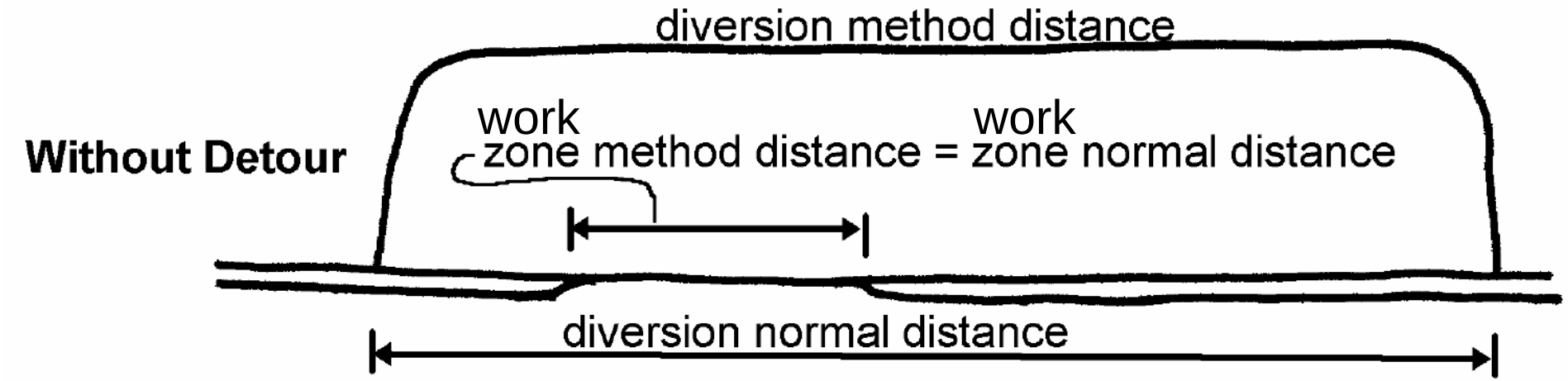


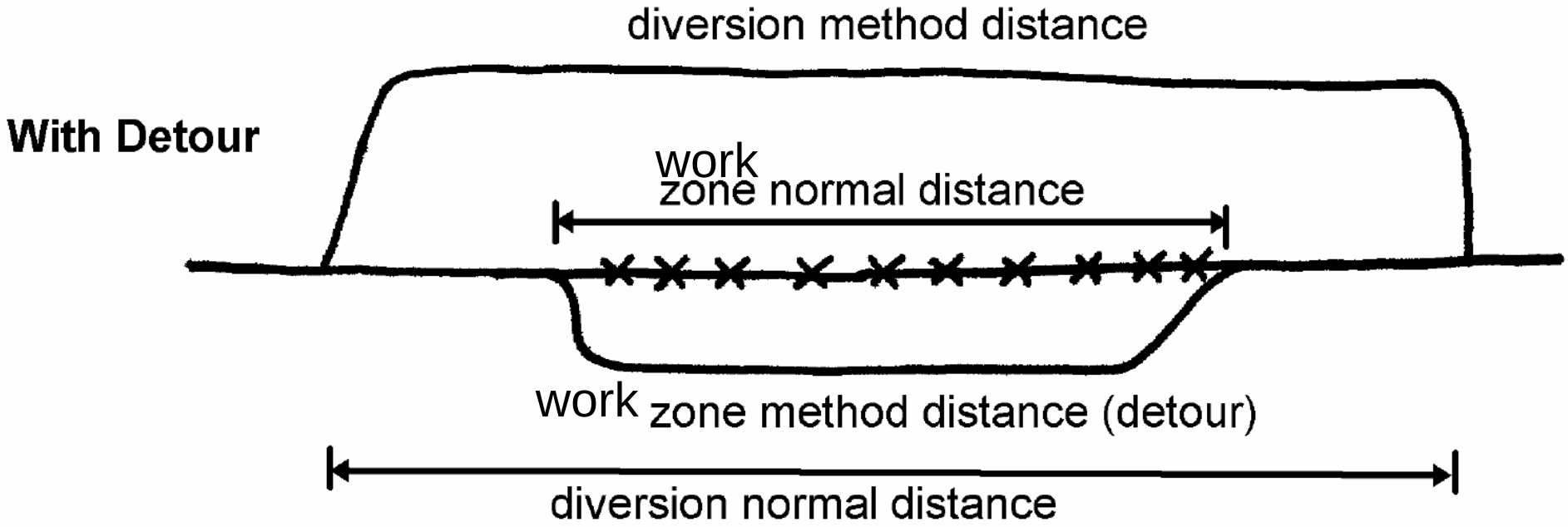
"Range" values: a secondary set of speed delay values for a different work zone capacity (use is optional). For example, if the capacity is at or below 750 VPH, D~0=45 mph, and D=C=34 mph.

Work zone method travel distance & speed	Distance each vehicle will travel through the work zone during construction, or a required detour around the work zone, if present. The speed vehicles travel through the work zone during construction is based on conditions that vary with demand and capacity in the work zone. This is calculated by CO^3 based on SPEED DELAY input above.
Work zone normal travel distance & speed	Distance and average speed each vehicle will travel if there is no construction, no work zone.
Diversion method travel distance & speed	Length and average speed of the most common alternate route vehicles will select to avoid going through the work zone or a required detour around the work zone. If there are several alternate routes, it is the average of the comparable lengths and average speeds, weighted by the number of vehicles expected to take each of them.
Diversion normal travel distance & speed	The distance each vehicle would travel if there were no work zone and the vehicle did not divert to an alternate route, and the average speed vehicles travel over the diversion normal travel distance, when there is no work zone.

See next page for a visual representation of the above table.

The average distance and speed can be calculated by using the "routes" tab in CO^3. See instructions later in this document.


diversion method distance
Without Detour
work
work
zone method distance = zone normal distance
diversion normal distance


diversion method distance
With Detour
work
zone normal distance
work zone method distance (detour)
diversion normal distance

DECREASE TO DEMAND	threshold	range
capacity for decreases to design demand (V/period)	2100	
canceled cars (with no delay) (%)		
canceled trucks (with no delay) (%)		
canceled cars (with delay) (%/min)		
canceled trucks (with delay) (%/min)		
diverted cars (with no delay) (%)	42.2%	
diverted trucks (with no delay) (%)	5.0%	
diverted cars (with delay) (%/min)		
diverted trucks (with delay) (%/min)		

Capacity at or below when the detour or the diversion route will be in effect.

Percent of cars & trucks that will cancel their trip because of the work zone.

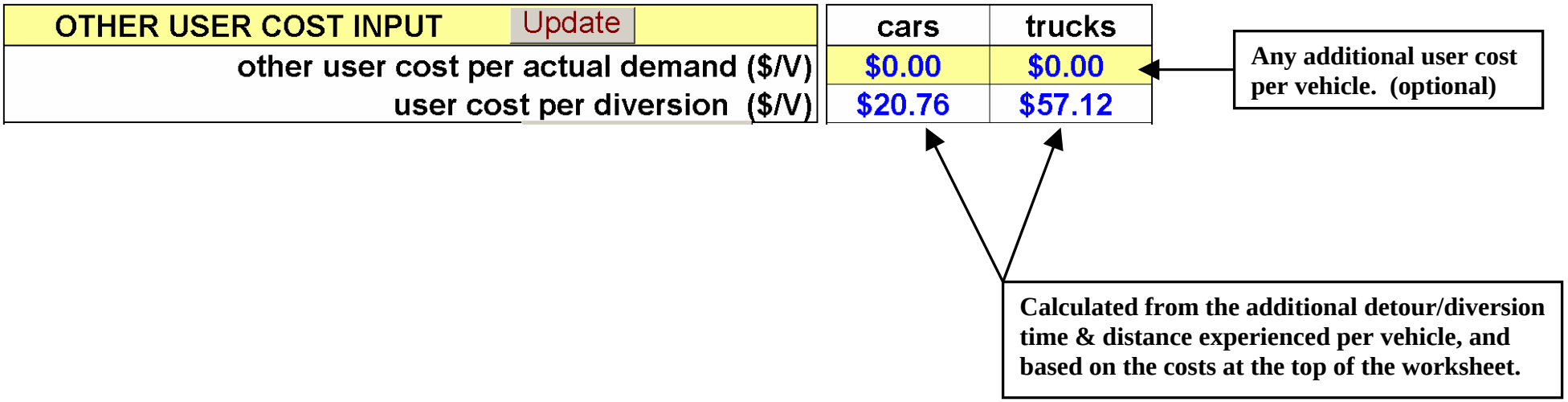
Percent of cars & trucks that will be detoured or will divert around the work zone.

With delay? or **with no delay?**

"with no delay" – regardless of how long users believe they will be delayed, this percent of drivers will cancel, divert or be detoured around the work zone.

"with delay" – drivers tolerate delay time differently. Generally, the longer the delay, the more drivers who will find their own way around a work zone. Thus, for every minute of work zone delay, this percent of drivers will cancel, divert or be detoured around the work zone. For example, your diverted cars (with delay) value is 5% per minute. If work zone delay is 4 minutes, 20% of cars will divert.

"Range" values: a secondary set of diverted/canceled percentages for a different work zone capacity (use is optional). For example, if the capacity is at or below 1400 VPH, more vehicles are likely to divert around the work zone or cancel their trips.


OTHER USER COST INPUT
Update
other user cost per actual demand ($/V)
user cost per diversion ($/V)
cars
trucks
$0.00
$0.00
$20.76
$57.12
Any additional user cost per vehicle. (optional)
Calculated from the additional detour/diversion time & distance experienced per vehicle, and based on the costs at the top of the worksheet.

This can be changed to examine NB & SB or EB & WB.

To examine directional weekday & weekend traffic, copy the traffic sheet to model the other bound.

PERIOD INPUT			backup at start (V)		0	0
	weekday	weekend	weekday	weekend	weekday	weekend
period	historical demand		design demand		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	260	622	260	622	1260	1260
1 A	208	379	208	379	1260	1260
2 A	182	352	182	352	1260	1260
3 A	208	244	208	244	1260	1260
4 A	208	208	208	208	1260	1260
5 A	416	416	416	416	1260	1260
6 A	909	909	909	909	1260	1260
7 A	1351	1351	1351	1351	1260	1260
8 A	1247	1247	1247	1247	1260	1260
9 A	1117	1117	1117	1117	1260	1260
10 A	1091	1407	1091	1407	1260	1260
11 A	1221	1597	1221	1597	1260	1260
12 P	1221	1921	1221	1921	1260	1260
1 P	1377	1840	1377	1840	1260	1260
2 P	1844	2030	1844	2030	1260	1260
3 P	2312	2312	2312	2312	1260	1260
4 P	2519	2519	2519	2519	1260	1260
5 P	2493	2493	2493	2493	1260	1260
6 P	1662	1840	1662	1840	1260	1260
7 P	1117	1488	1117	1488	1260	1260
8 P	935	1218	935	1218	1260	1260
9 P	857	920	857	920	1260	1260
10 P	701	785	701	785	1260	1260
11 P	519	731	519	731	1260	1260
Total	25973.63	29944.4	25974	29944	30240	30240

The number of vehicles backed up at the start of the first period being modeled. (optional) (12A in this example)

24 time periods can be modeled. (24 hours shown)

Optionally you can use 10 min, 15 min or 30 min time periods, if you have traffic counts with that breakdown.

Hourly work zone capacity.

Can be varied for every time period, depending on the number of lanes open during that period.

Actual hourly traffic counts.

Aged hourly traffic counts, based on the growth rate and years of growth. (optional)

Press the "Compute" button for each column, located between the 'other user cost input' and the 'period input' sections of the worksheet.

SUMMARY OUTPUT	traffic method	EB Stage 1	
	direction	weekday	weekend
	total user cost	$254,016	$299,866
	user cost of delays	$50,226	$64,921
	user cost of decreases	$203,790	$234,945
	maximum backup (V)	876	906
	maximum backup length (lane mi)	5.0	5.1
	maximum delay (min.)	44.3	45.8
	average delay, except diversions (min)	10.5	11.7
	total delay, except diversions (V hr)	2877	3719
	total vehicles canceled(V)	0	0
	total vehicles diverted (V)	9463	10910
	total decrease in demand (V)	9463	10910
	% decrease in demand	36.4%	36.4%
	delay per diverted vehicle (min)	35.1	35.1
	total diversion delay (V hr)	5542	6389
	average delay, including diversions (min)	19.4	20.3
	total delay, including diversions (V hr)	8419	10108
	user cost / design demand	$9.78	$10.01
	delay cost / actual demand	$3.04	$3.41
Aut ON Prin ON No OK	validity of output	VALID	VALID

You can copy these values into Impact Sheet

From the speed delay of going through the work zone.

From the vehicles that diverted or canceled.

This length is per lane mile. If the capacity reflects more than one lane, divide this length accordingly.

A check on whether the summary output shown was computed from the input shown. VALID indicates summary output shown was computed using the input shown. NOT VALID indicates one or more input values have been changed since the current summary output was computed.

ROUTE DISTANCE, SPEED, AND TIME				Route Title:			Detour around the I-69 work zone, using only State Trunkline						
Normal Travel							Method Travel						
Input				Calculated Values			Input				Calculated Values		
Route Name	% that Take Route	Distance (mi)	Speed (mph)	Travel Time (min)	Weighted Distance (mi)	Weighted Time (min)	Route Name	% that Take Route	Distance (mi)	Speed (mph)	Travel Time (min)	Weighted Distance (mi)	Weighted Time (min)
I-69	1	12.02	70	10.30	12.02	10.30	I-75 NB	1	14.225	70	12.19	14.225	12.19
							M-57 EB	1	12.522	45	16.70	12.522	16.70
							M-15 SB	1	12.409	45	16.55	12.409	16.55
Totals	1.00				12.02	10.30	Totals	3.00				39.16	45.43
Averages		12.02	70.00	10.30			Averages		39.156	51.71	45.43		
							Differences		27.14	-18.29	35.13		

The route each vehicle would travel if there were no work zone and the vehicle did not divert to an alternate route. Input the distance and average speed vehicles travel for each leg of the route.

Input the distance and average speed vehicles travel for each leg of the detour route(s) or the most probable diversion route(s). If more than one route, enter the percentage of vehicles that would take each route.

Input the average distances and speeds into the appropriate areas of the Traffic Tab. The user delay cost per vehicle diverted will be calculated automatically.